

Repetition Statement (**for** loop) in Python and Java

Problem statement: Write a program that simulates rolling of a fair four-sided dice. The program should roll a single dice 1000 times. Keep track of the number of each potential result (1 - 4) and display it as a percentage of the total number of rolls at the end.

Python solution: dice.py

```
1 import random
2
3 ones = 0
4 twos = 0
5 threes = 0
6 fours = 0
7
8 rolls = 1000;
9
10 for i in range(0, rolls):
11     dice = random.randint(1,4)
12     if dice == 1:
13         ones = ones + 1
14     elif dice == 2:
15         twos = twos + 1
16     elif dice == 3:
17         threes = threes + 1
18     elif dice == 4:
19         fours = fours + 1
20
21 print("1 was rolled %5.2f%% of times" %
22       (float(ones) / rolls * 100))
23 print("2 was rolled %5.2f%% of times" %
24       (float(twos) / rolls * 100))
25 print("3 was rolled %5.2f%% of times" %
26       (float(threes) / rolls * 100))
27 print("4 was rolled %5.2f%% of times" %
28       (float(fours) / rolls * 100))
29
```

Java solution: Dice.java

```
1 public class Dice {
2     public static void main (String [] args ) {
3         int ones = 0;
4         int twos = 0;
5         int threes = 0;
6         int fours = 0;
7
8         int rolls = 1000;
9         int dice;
10
11         for (int i = 0; i < 1000; i++ ){
12             dice = (int)(Math.random() * 4 + 1);
13             if (dice == 1)
14                 ones = ones + 1;
15             else if (dice == 2)
16                 twos = twos + 1;
17             else if (dice == 3)
18                 threes = threes + 1;
19             else if (dice == 4)
20                 fours = fours + 1;
21         }
22         System.out.printf("1 was rolled %5.2f%% " +
23                           "of times\n", (float)(ones) / rolls * 100);
24         System.out.printf("2 was rolled %5.2f%% " +
25                           "of times\n", (float)(twos) / rolls * 100);
26         System.out.printf("3 was rolled %5.2f%% " +
27                           "of times\n", (float)(threes) / rolls * 100);
28         System.out.printf("4 was rolled %5.2f%% " +
29                           "of times\n", (float)(fours) / rolls * 100);
30     }
31 }
```

Questions:

1. What is the format/syntax of the repetition statement in each language? Include all the details. How are the two similar and how do they differ?
2. How are the random numbers generated in each language?
3. There are four counter variables in each program (**ones**, ..., **fours**). Discuss the differences and similarities in declaration and initialization of those variables in Python and in Java.
4. The final results are printed using formatted output. What is the format/syntax of the function/method that provides formatted output in each language?

Write your own code: Rewrite the **Dice.java** program so that it simulates rolling of two fair four-sided dice. The possible outcomes are the sums ranging from 2 to 8. Notice that you cannot simulate it by just generating a random number from 2 to 8, you need to simulate two different dice and add the values (why?).